SWEET India

Sale Water for Everyone using Effective Technology

AMIT GOEL

(Second Year Student of MBA At Institute Of Rural Management Anand (IRMA). (2009-2010))

Executive Summary

Safe drinking water market for rural India is an upcoming market which is supposed to have high potential. Intervention in this sector started with government schemes, NGOs/NPOs programmes and now public-private partnership mode has been attracted an illumination as agenda or movement. In spite of lower requirement for safe drinking water in rural areas currently, the market is expected to grow very rapidly. Regions like Rajasthan, Gujarat, and Andhra Pradesh where water quality is relatively poor for drinking purposes, especially in rural areas are expected to be major thrust for investment. In Rajasthan, Andhra Pradesh it has been observed that the ground water and the local water bodies have high amounts of fluoride content in it. Electricity supply in rural areas for expected hours has been *sine-qua-non* to establish a water treatment plant in those areas unless the intervention of solar or biomass technology is prominent in this area. Although, electricity supply at concessional rate and provision of land and building spaces sometimes by Gram Panchayat augment for the business. The sustainability of business in this market depends upon fulfilling responsibilities by all partners involved in the model whereas viability of the business mostly harps on capacity utilization of the plant.

Sweet India organization a for profit organization with a difference, promoted by few young aspirants of IRMA[1], can venture into increasing rural market through its enterprise model in which it will first float Water Venture Sweet India (WVSI), which in fact, will invest in the service as an equity partner with other enterprises. Sweet India is our parent company which holds the subsidiary, WVSI, will focus on only household (HH) drinking water projects in rural India. Two different models have been proposed in this report. First model represents establishing water treatment plant and selling safe drinking water to villagers, ensuing second model which adds water pouch packing for selling to nearest town areas along with water selling to the villagers would be preferable. This will add on to capacity utilization of the plant giving quick and better returns to the business. Although in the recommended model, capacity utilization of the plant is calculated based on ten hours electricity supply but the flexibility lies on the point that plant can run even for twenty four hours a day depending upon requisite demand and electricity supply giving robustness to model in this service

[1] Participants get inspired after reading some reports, especially one prepared by Mr. Madhukar R who did his summer internship at IFMR Trust as part of course work fulfillment.

The proposed structure in this partnership model provides an opportunity to earn benefits in some way or other to each and every partner. First of all, the Sweet India is floating Water Venture Sweet India (WVSI) for water sector to add another portfolio in its wing and looking to enter rural water market which is supposed to have great potential and likely to give good economic and social return on investment. This new initiative may help understanding the fundamentals of rural market for SI which is suppose to enter in different sectors like health, education, etc. by using the water structure as a common community centre.

Conclusion and Recommendations: In spite of lower demand for safe drinking water in rural areas currently, the market is expected to grow very rapidly. Regions like Rajasthan, Gujarat, Punjab, Haryana, and Andhra Pradesh where water quality is very poor for drinking purpose especially in rural areas are expected to be major thrust for investment. The Sweet India can venture into increasing rural market through its enterprise model but adding business like water pouch packing for selling that to nearest town areas along with rural water treatment plants can give robustness to the model.

Table of Contents

1. Logic Model adopting LFA Framework

Input

Our plan is to setup a water purifier plant in *Utnoor* block of Adilabad district in Andhra Pradesh, India. In tandem with the mission and vision of our organization we will provide water at Rs. 2/- for a can of 20 litres. We will take permission from the tribal authority in *Utnoor* and then will set up requisites.

Activities

The core activity of our organization is to provide safe and clean water at affordable price. Apart from that peripheral activity of the organization is to establish a link with an NGO or Pani Samitii in that area and understand the local needs and the people. In the later stage, we will extrapolate business horizon replicating the model on PAN-India basis.

Outputs

As in the initial stages we will be concentrating only on the three blocks of Adilabad district, we will be proceeding block by block among these three blocks. First we will be concentrating on *Utnoor* block. It has 13 villages and each village has a population of around 600-650 and their daily consumption of water is around 3 litres per person.

So estimating that we will have a 50% market share we will be serving about 3000 people in *Utnoor* block which comes to 9000 litres per day.

Outcome

The outcome of this whole work of ours will be that people will not suffer from problems due to high fluoride content. As in villages the people usually are at subsistence level they will have more money with them, as there will be a reduction in the medical expenses.

Impact

Our impact statement will be that when we leave this place we want satisfaction in the eyes of the people of this area. The people should not suffer from problems like that of fluoride which can be easily prevented.

2. Venture Overview: the morphing of Rural India beyond Agriculture

2.1. About the organization

The Sweet India Pvt Ltd (SI) is commercially viable for profit organisation in the field of water purification across different sectors i.e Household as well as Industrial waste. Currently, a large segment of the Indian population does not have access to basic services such as clean water, education and health care, let alone the access to main-stream markets. This failure can be attributed to gaps in India's facilitative infrastructure and to under-performance of many public systems. The Network Enterprises

Fund aims to alleviate this situation by helping to build a network of enterprises that will provide the poor with a platform to engage markets as producers and consumers of goods and services. NEF in addition to direct equity financing also offers finance through mainstream commercial institution, managerial and technical support and partnerships with players across the value chain.

2.2. Mission Statement

The mission of the company is to "*provide safe drinking water to the people in the rural areas".*

Main aim is to treat the water polluted by fluorides and making the water safe to drink. Focus is on finding out the technologies which are cost effective and suitable in a particular area and implementing it.

2.3. Vision

"Developing an inexpensive and efficient water purification system according to World Health Organizational standards for the people of rural India".

2.4. Marketing Objectives

• Maintain positive, steady sales growth each quarter.
• Achieve increase in rural market penetration every two quarters.
• Generate brand equity so that SWEET India becomes a household word within the Rural India.

2.5. Financial Objectives

• Decrease fixed costs by increasing the sales base, leveraging economies of scale.
• Increase profit margin by 2% a year through operating efficiencies that are then passed throughout the organization.
• Do not decrease research and development, as a percentage of sales, regardless of the economic climate or market position.

2.6. Structure of Proposed Model

The structure of the proposed model has been prepared keeping four things into consideration. They are *reliability, financial sustainability, environmental sustainability and affordability*. Here, these terms mean to say;

Reliability:

It refers to the permanence of water supply to the villagers throughout the year against nominal charges. To make sure the permanence of water supply all the concerned partners in this initiative will sign a memorandum of understanding (MoU) mentioning role of all the partners.

Financial Sustainability:

It refers to the recovery of operation and maintenance as well as capital costs from user charges. Apart from it, some profit to all equity partners will be highly appreciated.

Environmental Sustainability:

It refers to proper recharge of aquifers and reservoirs and safe removal of wastewater from the immediate environment. In this model, the liability to provide raw water lies with Paani Samiti of the village. They with the help of PHED (Public Health and Education Department) will allocate raw water source/sources for the plant which, in general conception, will be same source/sources which is/are currently used by villagers.

Affordability:

It is measured by comparing combined cost of primary and substitute water supply of treated water with the cost of public services that meet good quality standards and for which user charges cover the full (O&M and capital) costs. In this regard, it would be proper to say that villagers are provided with either bore wells or supply water through pipes in few cases or they use rain water. Raw water in either of the cases does not meet quality standards in most of the occasions. The proposed structure will, anyway, provide treated and pure water as per quality standards in nominal price to the users.

Finally, the proposed structure suggests about two different models which may be chosen. The first one completely dedicated to treatment of water and sells it to villagers while the other one is combined with selling safe drinking water to villagers as well as selling water in nearest city areas after packing it into pouches. Again, two different combinations of initial investments have been applied in both models which depend upon the understanding among different partners in the model.

2.7. General Assumptions: basic tenet underlying the model

1. Electricity is available in the village,
2. Electricity supply of 10 hours at either existing or subsidized rate or free of cost is available,
3. Water purification plant capacity is 1000 litre/hour,
4. Maximum content of TDS in raw water is 8000 ppm (parts per million),
5. Water would be available ex-plant,
6. Village having number of household 500 (HH), One household having five persons,
7. Daily water consumption (drinking and cooking) per capita is 4 litres which means 20 litres per family per day.
8. Ownership of the plant will be with Water Venture Sweet India. Water Venture Sweet India (WVSI) would invest 40% of total initial investment as an equity partner and rest 60% will be invested by Water Venture Sweet India.
9. Water Venture Sweet India is taking 60% loan @12.5% interest rate with 5 year repayment schedule.
10. Water Venture Sweet India would charge 40% as return on investment.
11. NGO partner would charge 10% of net profit as administrative expenses.
12. Village where plant has to be established is in close proximity of the town area. (Approximately within 15-20 km range)
13. Demand of water packing company would be 1000 litre/day in 1st year, 1500 litre/day in 2nd year and 2000 litre/day in 3rd and subsequent years. Hence, total demand of water from plant will be 5000 litre/day in 1st year, 7000 litre/day in 2nd year and 9000 litre/day in 3rd and subsequent years. Therefore, capacity utilization of the plant in first year would be 50%, for second year 70% and for third and subsequent years 90%.
14. Paani Samiti (Village level water community) (include some Panchayat members) would provide

- Free water source
- Electricity connection and supply of 10 hours either free of cost or at subsidized rate or at normal rate
- Free land and building space for purification plant setup (optional as per requirement of the model)

2.8. Technology used

In the case of technology, we are planning to send a research team which will analyse the conditions in Utnoor block of Adilabad district for us and will inform us about the resources available.

As part of the preliminary treatment, Charcol and Risk husk filters will be used, so that initial impurities can be absorbed by these materials. As the fluoride content in these areas is high, only charcoal and rice husk wont be sufficient, therefore there is a need for an advanced technology.

Technology used for the purification plant depends upon raw water quality. As in the case of ground water where TDS is a problem, reverse osmosis (RO) will be used and where surface water is available and problem is of micro-organisms only, not of TDS, ultra violet (UV) technique will be used. The availability of technology has been widely explored and with the help of so many dealers extensive search for suitability and providers of various services have been conducted which all have been detailed in annexure 6.

2.9 Ownership pattern in all models:

Models	Ownership
Naandi Foundation, Hyderabad	Community
TERI, New Delhi	Community
Jal Bhagirathi Foundation, Jodhpur	Technology Supplier
Proposed Model	Sweet India Pvt Ltd

2.10. Partners

There will be four partners in the proposed structure of intervention by Sweet India (SI). SI will first float a Water Venture Sweet India (WVSI) which, in fact, will play role of a partner in the proposed set-up although being parent body; SI will continue to play an important role in the structure. Apart from giving guidelines on network enterprise, SI will completely finance the WVSI. It will also constantly monitor the operation of WVSI and extend technical support by collaborating with Water Health International and other technical experts. Twenty percent of the annual income from the plant to WVSI will be transferred to SI as it networking and technical assistance fee but this arrangement will entirely between WVSI and SI and not involving other partners.

Partners in water treatment plant

- Water Venture Sweet India (WVSI)
- Technology Provider
- NGO
- Pani Samiti

3. Safe Drinking Water Scenario

3.1 Background

WATER, ONE of nature's most important gifts to mankind, is an essential element to good health. Though 70% of the earth's geographical area is covered by water, only 1% of it is potable, the rest being unsafe for consumption. Natural water sources, especially rivers, annals', ponds, wells, etc. are being exploited, mistreated and contaminated, making drinking from them unsafe. Unlike in the inland areas, in delta regions, an adequate quantity of water is made available for drinking purposes, often through irrigation canals and sometimes through subsurface sources. Over the years, however, the canal water has become highly polluted with presence of physical and chemical impurities, as well as harmful bacteria.

Water purification is the process of removing contaminants from a raw water source. The objective is to produce water for a specific purpose with a treatment profile designed to limit the inclusion of specific materials; most water is purified for human consumption (drinking water). Water purification may also be designed for a variety of other purposes, including meeting the requirements of medical, pharmacology, chemical and industrial applications. Methods include, but are not limited to: ultraviolet light, filtration, water softening, reverse osmosis, ultra filtration, molecular stripping, deionization, and carbon treatment.

3.2 Global drinking water Scenario

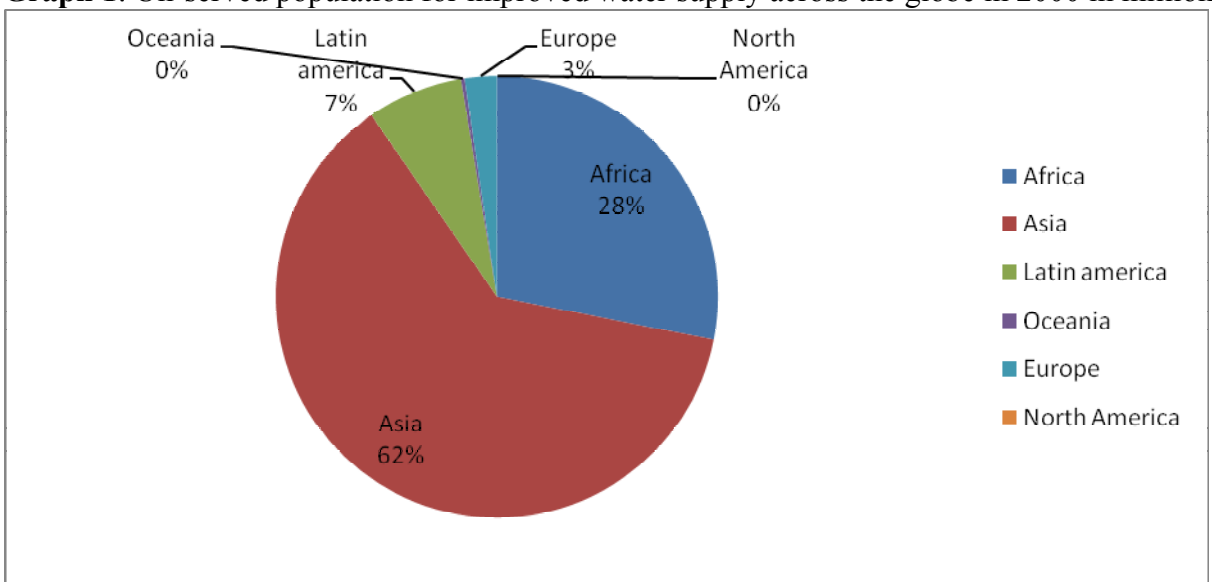
The Water Health Organisation (WHO) reported that more than 1.1 billion people across the globe draw water from unsafe sources, causing widely spread diseases like diarrhoea. Nearly 70% and 80% of these people live in rural areas. It is difficult to control the quality of drinking water even in the most developed countries, and small community water supplies frequently fail on basic microbiological quality and other physical impurities, like, suspended solids in case of surface water, and total dissolved solids (TDS) mostly in ground water. The lack of clean drinking water for some 1.1 billion people in this world has dramatic consequences: approximately 4 billion cases of diarrhoea are reported annually, of which 2.5 million ends in death. These cases of four billion cases of diarrhoea per year (WHO 2002), is placing diarrheal disease globally as the third highest cause of morbidity(disease) and the sixth highest cause of mortality(death), accounting for 5.7% of the global disease burden. This health impact is borne in particular by residents of the developing world, especially children (Parashar Bresee and Glass 2003, WHO 2004). Ninety percent of deaths from diarrheal diseases in the developing world occur in children under the age of five (WHO 2005). Every day around 6000 children die due to the lack of safe drinking water.

Women and children, particularly girls, bear an additional burden related to an inadequate water supply: time spent collecting and transporting water diminishes time available for other productive applications, especially school. Lack of access to safe water is strongly correlated with poverty, and the provision of safe drinking water is considered to be a fundamental step in a community's transition out of poverty. The international commitment to alleviating the global burden associated with inadequate drinking water was affirmed during the recent Millennium Development Goal (MDG) process. One of these goals tackles water supply and sanitation directly, aiming to: **"Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation"** based on baseline data from 1990. Measuring progress in fulfilling this target is, accordingly, dependent on the definition used

for 'safe drinking water.' The WHO differentiates between the concepts of 'safe' and 'improved,' which leads to some confusing results.

A concerted global effort in the 1990s resulted in over a billion people gaining access to safe water – 83 per cent of the world's population now (in 2002) use improved drinking water sources. However, a similar number of people (1.1 billion) are still forced to use unsafe water sources. Out of these 1.1 billion who are exposed to un-improved drinking water sources, 62% belong to Asia whereas Africa stands second in the list with 28%.

Graph 1: Un-served population for improved water supply across the globe in 2000 in million



3.3 Some important water facts in nutshell

- More than one billion people worldwide do not have access to safe drinking water – i.e. around 1/6th of the world's population.
- Five million people, mostly children, die each year from waterborne disease.
- In the past 10 years diarrhoea has killed more children than all the people lost to armed conflict since World War II.
- At any one time, approximately half of the world's hospital beds are occupied by patients suffering from waterborne disease.
- Diarrhoea kills over three million people per year and chronic diarrhoea is a leading killer of people with AIDS.
- The average distance that women in Africa and Asia walk to collect water is 6 km.
- The average weight of water that women in Africa and Asia carry on their heads can be anything up to 20kg - the equivalent of your airport luggage allowance!
- One of the Millennium Development Goals of the UN is: "By 2015, reduce by half the proportion of people without sustainable access to safe drinking water".
- The WHO default levels for the quantities of drinking water are:
  1 litre water/day for a 10 kg child
  2 litre water/day for a 60 kg adult

4. Market Analysis and Marketing Strategy

Safe drinking water comprises of Rs.600 crore domestic water purification industries and the packaged water business worth is Rs. 1,200 crore. In year 2003, total Indian drinking water market is estimated to be $2000 million. At present, rural drinking water sector is a new area for making investments but case studies of different models working in this sector shows lack of demand in rural areas. Establishing technology based desalination plants requires high cost of capital which affects the financial health of the business to a greater extent.

4.1. Drinking water market prospects

The growth trend is seen in overall India, drinking water market (DWM) creates promises for alternative means of providing safe drinking water to the community and specifically for rural community as a stimulus for rural community development. Significant potential exists to create a market of safe drinking water for rural India. Over seventy percent of India's population resides in rural areas comprised of over six lakhs villages. These villages represent a tremendous diversity of quantity and quality of water resources. Not all villages, however, are affected to water problems, but most of them have austerity of either quantity or quality of water or both. Targeted villages for Community Safe Drinking Water Project (CSDWP) are only those where water is available but it is not potable. Investments are required to identify and stimulate CSDWP where it is most likely to bring economic and social returns to the local area as well as required financial returns to the investor.

Safe drinking water becomes a priority and this is a signal for rupees six hundred crores domestic water purification industry for setting up its operations. Corporate control over water and water distribution in India has been growing rapidly: the packaged water business is worth rupees one thousand two hundred crores and it is growing at a huge forty to fifty percent annually.

4.2. Opportunities

It is difficult to estimate the proportion of population that has access to clean drinking water. At the time of the First Five Year Plan (FYP), six percent of the rural population and some forty eight percent of the urban population had access to safe drinking water. There has been a dramatic increase in coverage, and by 1994-95, as much as eighty two percent of the rural population was covered. According to the Centre for Science and Environment, about eighty one percent of the country's total population has access to safe water.

4.3. Market Players

Market players can be divided into five different groups. They can be;

1. Technology developers,
2. Manufacturers / Assemblers,
3. Government bodies,
4. Private bodies (Non-profit and for-profit organizations),
5. Funding Agencies

Technology developers are those who basically work for invention and improvement of technologies to be brought in the safe drinking water sector. DOW Chemical Company of United States and Water Health International has been known to be technology developer for Reverse Osmosis (RO) and Ultra-violet (UV) technology[2] respectively. Some details about list of companies which have been manufacturing water treatment plants and other instruments based on RO/UV technologies are appended (as shown in **Annexure 5**).

5. Products/Services offered by Sweet India

The process in Reverse Osmosis (RO) technology based water treatment plant starts with pushing water through deed pump of one horsepower (HP) to sand filter which suspends all particle upto twenty microns. Here, it would be important to mention that in case soil from where raw water source originating is thin, presence of suspended particles will be more in the water whereas it would be less if soil of raw water source is sandy. After suspending all particles upto twenty microns by sand filter, water enters to carbon filter which basically removes bad colour, odour and smell, if any, from raw water. From this stage, water enters into micron filter which suspends five to twenty micron particles existing in the water. Again, water is run through one micron filter which completely removes presence of any particle from water ranging from one to five micron. Here from, water is pushed through high pressure pump in the membranes of reverse osmosis system which removes dissolved solids from water up to ninety to ninety to ninety nine percent. These dissolved solids could be calcium, magnesium, chlorine, fluorine, sulphur etc. Now, if ultra-violet or ozone ray machine is established in the plant, water will be passed through that machine which removes any micro-organism existing in the water. Ultra-violet rays are effective for only two days not to get micro-organism again in the water whereas ozone rays could be effective for fifteen days for the same generally.

The process in ultra-violet (UV) technology based water treatment plant starts with pushing raw water through feed pump to raw water storage tank from where it is feed to duel media filter which utilize a bed of sand, crushed granite or other material to filter water for drinking and other applications. After filtering raw water, clean water is sent to cartridge filter banks whereas brine is sent to backwash tank from where it is properly drained off. Again, cartridge filter banks remove sediments from water up to the size as per its capacity. Cleaned water is feed to ultra-violet waterworks purification modules for final treatment whereas brine once again sent back to backwash tank. Now Ultraviolet (UV) system uses ultraviolet rays to treat water and render micro-organisms harmless. The UV rays come from a high intensity lamp that is usually enclosed in a protective quartz sleeve. When water passes through the water treatment system, the UV light damages the structure of any organisms and makes them sterile. Finally, water reaches to treated water storage tank.

[2] RO and UV- methods are two methods which are being used worldwide to purify water. RO is the latest technology in the market which makes use of the Osmosis system.

6. Financials of Sweet India

Detailed cash flows have been separately produced and shown as below with the earlier assumption in the model as mentioned and the projections have not been done keeping in mind the simulation which takes into account the variation as per the project and market fluctuation as the market is stable and highly predictable in the area of proposal.

6.1. Highlight

	1st year	2nd year	3rd year	4th year	5th year
Capacity Utilization	50%	60%	70%	75%	80%
Production in litre in lacs	18.25	21.90	25.55	27.37	29.20
Revenue in lacs (Rs.)	1.82	2.19	2.55	2.74	2.92

6.2. Physical performance

ITEMS	Amount (Rs.)
Capacity of plant (365 days for 10 hrs./day)	36.5 lacs litre
Break-even quantity	13.83 lacs litre
Break-even percentage	37.9%
NPV	Rs.64902
Pay-back period	3 years 10 months
IRR	16%
Cost of capital	12.5%

6.3. Benefits to partners in 5 years

ITEMS	Amount (Rs.)
Total Initial Investment	5.17 lacs
Investment by Sweet India	2.07 lacs
Investment by Water Venture Sweet India	3.10 lacs
Profit to NGO	0.38 lacs
Profit to WVSI	1.35 lacs
Profit to Water Venture Sweet India	2.03 lacs

6.4. Cash flow if land and building cost is not borne by Paani Samiti (only water selling)

Details	**YEAR 0**	**YEAR 1**	**YEAR 2**	**YEAR 3**	**YEAR 4**	**YEAR 5**
Investment						
Land	(-)17,500.00					
Building	(-)105000					
Plant and Machinery	(-)343200.0					
Fitting	(-)14000.00					
Utilities	(-)22500					
Pre-operative Expenses	(-)12500.00					
Working Capital margin	(-)2600.00					

Total Investment	***(-)517300.00***					
Sales						
Capacity Utilisation (%) in water		*0.50*	*0.60*	*0.70*	*0.75*	*0.80*
Production (in litre)		1825000	2190000	2555000	2737500	2920000
Selling Price (Rs./litre)		0.10	0.11	0.12	0.12	0.12
Revenue from selling water		**182500**	**240900**	**306600**	**328500**	**350400**
Revenue from selling cans		20000	4000.00	4000.00	20000.00	4000.00
Sales Revenue		***202500***	***244900***	***310600***	***348500***	***354400***
Cost of Production and Sales						
Raw Materials(water)		*0*	*0*	*0*	*0*	*0*
Power		36000	37800	39690	41675	43758
Wages and Salaries		36000	37800	39690	41675	43758
Plant Overheads		3000	3150	3308	3473	3647
Water cans cost		20000	4000	4000	20000	4000
Interest on Working Capital Loan		1875	375	375	1875	375
Total Cost of Production and Sales		***96875***	***83125***	***87063***	***108697***	***95538***
Profit Before Depreciation, Interest and Tax (PBDIT)		105625	161775	223538	239803	258862
Depreciation		90423	72759	58736	47566	38640
Profit Before Interest and Tax (PBIT)		15203	89016	164801	192237	220222
Interest on Term Loan		*38798*	*31038*	*22634*	*14229*	*5825*
Profit Before Tax (PBT)		(-)23595	57978	142168	178008	214398
Write-off of preliminary expenses		0.000	0.000	0.000	0.000	0.000
PBT less write-off of prel exp.		(-)23595	57978	142168	178008	214398
Unabsorbed loss of previous years		0	23595	0	0	0
Gross Income		(-)23595	34383	142168	178008	214398
Deduction for new units		0	0	0	0	0
Total Income		(-)23595	34383	142168	178008	214398
Income-tax Rate (%)		33.9900	33.99	33.99	33.99	33.99
Income-tax		0.00	11686.86	48322.84	60504.95	72873.81
Profit after tax (PAT)		(-)23595	22696	93845	117503	141524
Net Salvage Value of fixed assets						125550

Net Recovery of WC Margin						2600
Net Cash Flow (NCF)	(-)517300	92438	115943	167522	174462	312158
Present Value (PV) of Net Cash Flows	(-)517300	582202				
Net Present Value (NPV)	**64902**					

6.5. Payback period (PBP)

3.81 years or 3 years 10 months

Calculation	Year		Cash flows	Cumulative inflows		
	0		(517300)(-b)			
	1		92438		92438	
	2		115943		208381	
	3	(a)	167522		375903	(c)
	4		174462	(d)	550364	
	5		312158		862523	
	PBP	a+(b-c)/d				
		381%	OR 3.81 years			
COST OF CAPITAL	**12.50%**					

6.6. Assumptions

- Capacity utilization in Ist yr is 50%, in 2nd yr is 60%, in 3rd yr is 70%, in 4th yr is 75% & in 5th yr is 80%
- Power, salary and overhead cost is increased by 5% every year
- Income tax rate is 33.99
- Salvage value is 25% of fixed assets
- NPV calculated at 12.5%

7. Socio-economic Impact Analysis

Diarrhea alone causes more than 1600 deaths each day - more than any other disease. Also the number of man-days lost leads to so much loss of productive contribution in the overall GDP growth share that would have accrued.

The local employment generation which can prevent the migration of at least 3 people which will now be employed in our plant itself where the one person operate and ensure sales for four hours in morning while the another will do so for four hours in the evening also the village health promoter which will act as a media of direct awareness building and generating concern in the minds of the community. And 75 out of 100 children below 5 years of age needlessly die early because of the water they consume. It is this shame - and the fact that not only us but 73 per cent Indians feel it deeply as well - that triggered the birth of the safe drinking water initiative.

But it has been proven that providing purified drinking water at affordable rates cannot, on its own result in a reduction in exposure to environmental risks that lead to waterborne diseases. To make this happen we have taken on the mission to facilitate the following:

Health and Hygiene education:
We work through intensive campaigns on health and personal hygiene to educate rural communities on the need to store water carefully, adopt hygienic sanitation practices and avoid contaminating water resources. This in turn helps to influence conventional rural mindsets to adopt safe water and creates demand from villages / panchayats to implement the Safe Drinking Water programme for their villages.

Technology transfer:
We constantly network and explore partnerships that facilitate the transfer of cutting edge, competitive, affordable technology that can address various challenges across the country in making water potable.

Raise funds:
Enable global citizens, corporate, philanthropists and others to join hands with the Panchayats, adopt villages, and become partners by contributing resources so every habitation in India is equipped with its own Community Safe Drinking Water programme.

Reduction of diseases caused by chemical and pathogen contamination, better health conditions and general well-being have been some of the observations from families using this water.

Could this project be the answer to providing safe drinking water to all in the country?

Most likely, because it integrates the 'Bottom of the Pyramid (BOP)[3]' principles and includes dissemination of appropriate information to the rural communities and prospective beneficiaries on the need to adopt safe water and hygienic sanitation practices. The Project has the potential to become the Single Largest Non-Government Water Initiative.

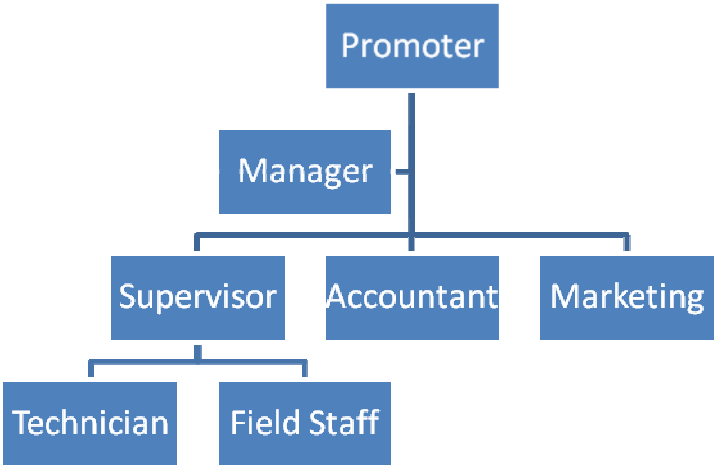
8. Management and Organization

The size of the business is small and it intends to cater only to Andhra Pradesh for its initial years of operation.

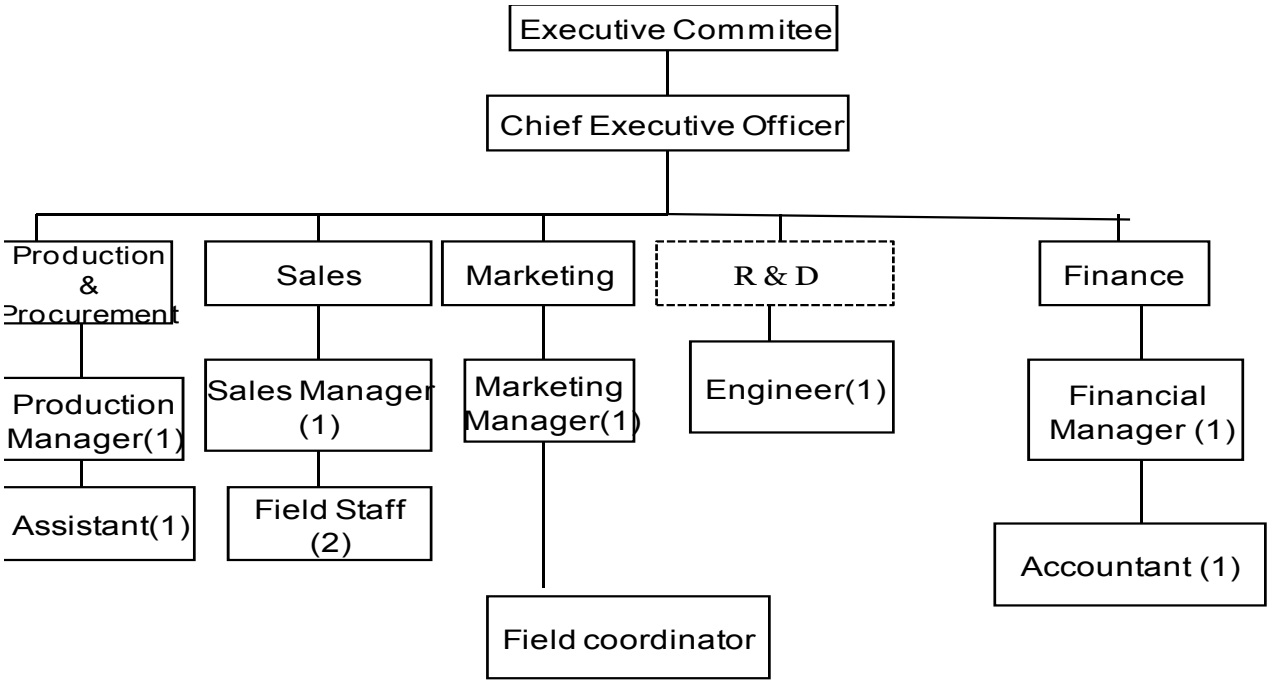
8.1. Initial

Initially the structure is simple. However with the rise in demand and production correspondingly, we will be employing more and more manpower, which will lead to a Functional structure at the end of 2 years, and matrix structure by 3-4 years end.

[3] Contextualized under the purview of rural India, concepts adopted from Prahlad, C.K. (2005), *The Fortune at the Bottom of Pyramid*.



8.2. After 2 years



As after two years we will be seriously into sales and achieving targets will be one of our main goals the sales department is a must. The sales department will have a sales manager and two field staff which can be increased upon need. As of now only two field staff is required. A separate department for R &D is very important because we as an organization thrive to produce more cost effective methods so that we will be able to help out the people in a better way.

Finance department has also been added because the sales revenue and any purchases are to be taken care of by the finance department.

8.3. After 3-4 years

As we progress into third and fourth years of our organization, we plan to grow in size too. As expansion is one of our important objectives, we plan to increase our man power. The field staffs in the sales department have been increased to 5 from 2. The size of the engineer man power has also been increased in the R & D department as their need is being felt more. To look after marketing the product of SWEET India we also plan to add two assistant managers who will look after the marketing of the product.

TABLE 1: Designations and Skills required.

Designation	**Required skills**	**Responsibilities**
Chief Executive officer	Leadership skills, experience	Determining goals, strategic planning
Marketing head	Understanding of the area. Marketing skills.	Communication with subordinates, Coordination with sales department
Finance head	Good accounting & analytical skills	Looking over accounts & purchases
Sales head	Experience in sales field	Planning, coordination
Services and maintenance	Expertise in handling machinery	To prevent time lags in production due to repairs and damage.

8.4 Mentors

Mr. Aditya Kumar Shukla
IRMA
He provided us lot of material regarding the water purifier industry and the major players in the market. He was also of immense help in providing us great insights regarding the rural market.
Mr. Kushankur
IRMA
He greatly helped us in writing our report and expressing our thoughts in a much better way. He with his immense experience made us understand the needs and wants of the rural people.

9. Operations of the Plant

One operator would be deployed in the plant that will run the operation in day time. Time for opening and closing of the plant will depend upon time of electricity supply in the village, capacity utilization and convenience of the users which will finally be decided by the Water Venture Sweet India in consultation with *paani samitii*. Water tape will be installed in the plant site with water meter from where villagers themselves will fill-up their water cans. These water cans will be purchased by Water Venture Sweet India from the market and will be given to the villagers in the same price. Proper cleaning of water cans will be responsibility of users only but once in a fortnight, plant will provide them chlorine water to clean water cans. Users will be issued water coupons as a right to take water from plant by Gram Panchayat every

month against payment of user charges which will finally be deposited by Gram Panchayat in the bank account of plant. Operator will maintain register for daily users coming for filling-up water cans and will also pass entry in their water coupons.

Two operators would be deployed in the plant to look after the operation in case pouch packing work is also undertaken in the proposed structure. One will look after operation of water treatment plant and other will work for pouch packing as well as he will test at least 1 sample of water pouch in testing lab established in the plant itself every-day. One manager will be deployed who will look after sales and marketing operation of packaged water. He will deal with contractor for transportation of pouch water and distributor. His job will involve taking order from distributor every-day, execute it, collect payment, maintain the account and deposit money in the bank.

On the management front the organization will mainly adopt the three fronts of verticals that is one for operations and maintenance jobs of the plant, another for the mobilising of the resources and funds at cheap levels from the community and the last one for undertaking the mobilizing tasks of community etc.

10. Performance Benchmarks

The proposed structure in this partnership model provides chance to earn benefit in some way or other to each and every partners. First of all, the SI is floating WVSI for water sector to add another portfolio in its wing and looking to enter rural water market which is supposed to have great potential and likely to give good economic and social return on investment. This new initiative may help understanding the fundamentals of rural market for SI which is suppose to enter in different sectors like health, education, etc. by using the water structure as a common community centre.

WVSI:

The WVSI apart from getting financial benefit will benefit from leading a sustainable business model with ability to scale nationwide and drive lasting change in the drinking water sector. It will help rural community to have access of safe drinking water which will prevent villagers from many sorts of diseases. As the organization grows and spreads all around the country, lots of employment opportunities will be created which will benefit both WVSI and rural community in parallel.

Paani Samiti:

It would get safe drinking water available at village to feed the community in an affordable price, directly impacting health condition of the community. It will earn reputation for Paani Samiti and Gram Panchayat (Paani Samiti comprising some villagers and some members of Gram Panchayat) in the eyes of community.

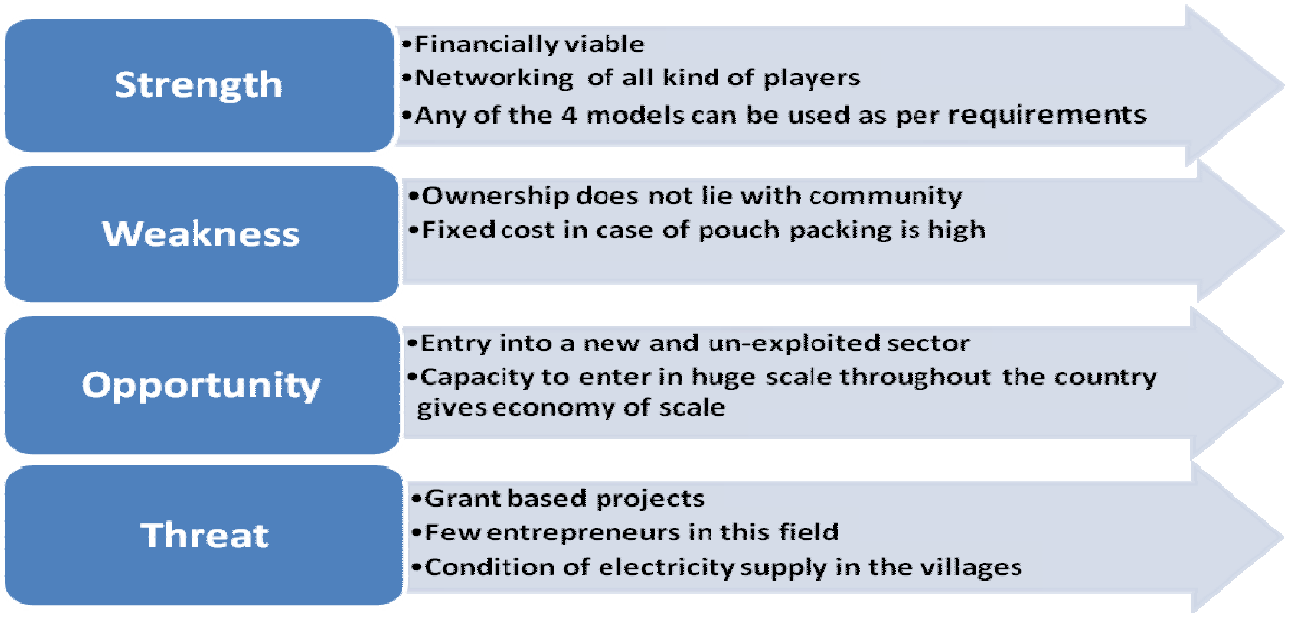
NGO:

Apart from getting administrative fee from the business, NGO could use this opportunity to fulfil their vision to serve the society and earn reputation by people.

Technology Partner:

Getting business by supplying purification plants, pouch packing machine and annual maintenance contract (AMC). It also gets itself involved in the network of water business which will help it to be known among many prospective customers.

11. SWOT analysis



12. Risk Assessment and Contingency Plans

Some of the anticipated risks that are likely to pose constraints to our enterprise are highlighted below keeping in mind the susceptibility of the business prospects involved at different levels have been highlighted below. These are listed as follows along with some approaches for the remedial measures:

12.1. Low Demand

To make any service financially viable, requirement of service to the people is very important. Operating in the rural area may be resulting in lower requirement which can adversely impact running this service. Again, to charge for free commodity available to the people (may not be safe) leads to paranoidism.

12.2. Monitoring

Service monitoring becomes a tedious process as it happens to be difficult to coordinate among all partners simultaneously. Most probably, having plant established in villages creates distance between place of operation and partners residing somewhere, at sometimes, cause's operational problem.

12.3. Inadequate Electricity Supply

The overall condition of electricity supply in villages throughout the country is not very good. While villages in states like Gujarat, Maharashtra receives good amount of electricity supply, the condition of

villages in states like Bihar, Uttar Pradesh is bad. So dependence of water purification plant electricity is very crucial factor in this service. Unless, technology like solar or bio-mass gasifier comes with full force, a threat to this business will continue to be running.

12.4. Government schemes

Generally, government schemes in drinking water sector are supposed to be a threat to private services in this sector. This is because of the fact that government schemes with the help of its existing institutional set-up and workforce can spread in big way as well as in remote areas. The government schemes also do not look much at financial viability of the service because they do it completely for social cause whereas a private business always wants to achieve financial viability, therefore, posing a great challenge to private business models.

12.5. NGOs working on grants

Organization coming in this sector working on grants and donations are supposed to be more competitive in comparison to private business as it can provide more lucrative proposition to the users. This could be possible in case business run on grants basically look for recovery of cost of operation and maintenance and not the profit while the service perspective of a private service is to earn profit.

References

Primary information collected and collated from the following resource persons

Dasgupta, Sakshi, Research Associate, TERI, New Delhi, contacted on March 20, 2009.
Gupta, Madhukar, Employee, IFMR Trust, contacted on March 10 & 12, 2009.
Gupta, Pawan, Technical Director, Environze Global Ltd., contacted on April 5, 2009.
Kapur, Deepender, Country Representative, Water Aid India, New Delhi, contacted on March 25, 2009.

Secondary literature bases

Retrieved from http://www.unicef.org/wes/index_statistics.html accessed on March 24, 2009
Retrieved from http://waterhealth.com/ accessed on April 03, 2009
Water Aid India report 2005, (drinking water status and sanitation in India; coverage, Financing and emerging concerns)
Harris, John, Challenges to the Commercial Viability of Point-of-Use (POU) Water Treatment Systems in Low-Income Settings

Appendices

Annexure 1: Improved vs. Unimproved water source

Improved sources of drinking water	**Unimproved sources of drinking water**
Household connection	Unprotected well
Public standpipe	Unprotected spring
Borehole	Rivers or ponds
Protected dug well	Vendor-provided water
Protected spring	Bottled water*
Rainwater collection	Tanker truck water

*Bottled water is not considered improved due to limitations in the potential quantity, not quality, of the water.

Annexure 2: Government bodies

Sl. No.	**Name**	**Project**	**Activities**
01.	Department of Drinking Water Supply (DDWS) under Ministry of Rural Development (MoRD) in Government of India	Rajiv Gandhi National Drinking Water Mission	Installation of water supply schemes utilising, dependable sources thus assuring sustainable water supply.
02.	Public Health and Engineering Departments (PHED), State Governments	--------	Water supply to households, public and private places
03.	Water and Sanitation Management Organization (WASMO), Gujrat govt.	Swajaldhara	Decentralized, demand-driven and community-managed safe drinking water program
04.	Rajasthan Community Business Alliance on Water (RCBAW) (Partnership between Government of Rajasthan and Confederation of Indian Industry)		Statewide water and watershed management program

Annexure 3: Details of private bodies for-profit organizations (Commercial Business Houses)

Sl. No.	**Name of the company**	**Address**	**Products**
01.	Eureka Forbes	Konkan Nagar Co-operative Housing Society Ltd., Prakash Narayan Kotnis	AquaGuard

		Marg, Mahim (West), Mumbai - 400 016. Tel : +91-22-2444 3436	
02.	Kent Mineral RO	Pure Water House, # 30 , 6th Cross, Hutchins Road, St. Thomas Town, Bangalore-560084. Phone : 91 080 25489762, 32712265. Mobile : +91 9845043424 Fax : 91 080 25489776 E-mail: enquiry@purewaterhouse.com Email us at : purewaterhouse@airtelbroadband.in	RO, UV and membrane purifiers
03.	Pall Pharmalab Filtration Ltd	Star metal compound, l. b. s. road, vikroli (w), MUMBAI 400083 91-022-5789105, 91-022-5789106	Filters
04.	SINTEX IDUSTRIES LTD. PLASTICS DIVISION	KALOL (N. GUJARAT) 382 721. INDIA , Phone : 253500, Fax : (02764) 253800 email : plastic@sintex.co.in	light-weight purifier, Silverline @ Rs 3,000
05.	Thermax	Thermax House 4, Mumbai Pune Road Shivajinagar, 411 005 Pune (+91) 20 - 2551 1226	20-litre packs of drinking water, branded Good Water, at Rs 60 a pack.
06.	HI-TECH RO System	OLD NO. 30, NEW NO. 16, DR. MUNIAPPA ROAD, KILPAUK, CHENNAI - 600010. (044) 42858229 / 26650020 / 9380520906 chennai@hitechro.net	Water purifiers

Annexure 4: Drinking Water Quality Standards

		International Standards WHO - 1971		ISI 10500 1983		NDWM, DRD Govt. of India	
Sr. No.	Parameters	Highest Desirable limit	Maximum permissible limit	Highest Desirable limit	Maximum permissible limit	Highest Desirable limit	Maximum permissible limit
1.	Colour	5 PCU	50 PCU	10 HU	50 HU	5 HU	25 HU
2.	Taste & Odour	UO	UO	UO	UO	UO	UO
3.	Turbidity	5 JTU	25 JTU	10 NTU	25 NTU	5 JTU	25 JTU
4.	TDS.(mg/l)	500	1,500	500	3,000	500	1,500
5.	pH	7.0 - 8.5	6.5 – 9.2	6.5 - 8.5	9.2	7.0 - 8.5	6.5 - 9.0

6.	Hardness ($CaCO_3$, mg/l)	100	500	300	600	300	600
7.	Calcium (Ca, mg/l)	75	200	75	200	75	200
8.	Magnesium (Mg, mg/l)	30	150	30	100	50	100
9.	Chloride (Cl, mg/l)	200	600	250	1,000	200	1,000
10.	Sulphate (SO_4, mg/l)	200	400	150	400	200	400
11.	Nitrate (NO_3, mg/l)	45	-	45	45	45	100
12.	Fluoride (F, mg/l)	0.7	1.0	0.6 - 1.2	1.5	1.0	1.5
13.	Iron (Fe, mg/l)	0.1	1.0	0.3	1.0	0.1	1.0
14.	Manganese (Mn mg/l)	0.05	0.5	0.1	0.5	0.1	0.5

Notes: PCU = Platinum Cobalt scale Unit. HU = Hazen Unit. JTU = Jackson Turbidity Unit. NTU = Nephelometric Turbidity Unit. UO = Unobjectionable

Annexure 5:

Details of reverse osmosis filtration technology

Name of Technology	**Reverse Osmosis Filtration**
Functioning/Process	A reverse osmosis water purifier uses a semi-permeable membrane that allows pure water to pass through it, while contaminants are trapped by the tiny pores in the membrane. The process requires that the water be pressurized to help force it through the membrane. The effectiveness of a reverse osmosis water purifier depends on the density of the membrane.
Effectiveness	They are capable of filtering out a long list of contaminants including: • chlorine and other treatment related products • bacteria, salts, sugars, proteins, dyes, heavy metals
Advantages	Removes nearly all contaminants of all types to some extent. Requires little maintenance.
Disadvantages	a) Expensive than carbon filter treatment systems. b) The purification process is slow due to the use of pressurized water.

Details of ultra-violet rays filtration technology

Name of Technology	**Ultra Violet Rays Filtration**
Functioning/Process	Uses ultraviolet (UV) light to treat water and render micro-organisms

	harmless. The UV light comes from a high intensity lamp that is usually enclosed in a protective quartz sleeve. When water passes through the water treatment system, the UV light damages the structure of any organisms and makes them sterile.
Effectiveness	UV water purification systems are effective on most bacteria, viruses, algae and other organisms. A whole house water system is more effective than a countertop system as it exposes the water for more duration.
Advantages	Capable of providing water cleaner than Carbon filters but less purified than Reverse Osmosis filtration.
Disadvantages	a) UV water purifiers are the most expensive water purification technologies, almost double of RO technology b) UV do not remove chlorine, heavy metals etc.

Details of chlorine bead technology

Name of Technology	**Chlorine Bead Technology**
Functioning/Process	The ion exchange process percolates water through bead-like spherical resin materials (ion-exchange resins). Ions in the water are exchanged for other ions fixed to the beads. De-ionization (DI) beads exchange either hydrogen ions for cations or hydroxyl ions for anions.
Effectiveness	Removes dissolved in-organics like Nitrate, Sulphate, Fluoride, Iron, Magnesium, Calcium, and Manganese effectively.
Advantages	a. Re-generable (service deionization). b. Relatively inexpensive initial capital investment.
Disadvantages	a) Does not effectively remove particles, pyroxenes or bacteria. b) It generates resin particles and culture bacteria. c) High operating costs over long-term.

Details of carbon filter technology

Name of Technology	**Carbon Filter**
Functioning/Process	Carbon is one of the most powerful absorbents available and the absorbing powers of carbon can be further enhanced by adding a slightly positive electrical charge. This is known as activated carbon, and it is used in many standard home water filters. As the water passes over the positively charged carbon, the negative ions of the contaminants are drawn to the surface of the carbon granules and removed from the water.
Effectiveness	Activated carbon filters help reduce or remove a wide variety of contaminants, including: • volatile organic chemicals (VOCs) • pesticides and herbicides • chlorine, radon, and other chemicals often found in tap water.
Advantages	a) Removes dissolved organic compounds. Works well in conjunction with other filtration systems. Removes objectionable odours and flavours. b) Relatively inexpensive. A carbon filter systems that fit on your faucet costs about $30, a whole house water purification system that utilizes carbon filter technology for around $100.
Disadvantages	a) Carbon block filters are not effective at removing heavy metals or bacteria.

	b) Filters must be changed or filtering capacity will be compromised.

Details of some of the private bodies non-profit organizations

Sl. No.	Name	Address	Contact Person	Projects
01.	Byrraju Foundation	Satyam Enclave, 2-74, Jeedimetla Village, NH-7 hyderabad-500055	Prasada Raju	RO based Sujala water treatment plant in Andhra Pradesh
02.	Naandi Foundation	502, Trendset Towers, Road No.-2, Banjara Hills, Hyderabad – 500034	Amit Jain	UV based water treatment plants in Krishna district of Andhra Pradesh
03.	The Energy and Resource Institute	Darbari Seth Block, Lodhi Road, IHC Complex, New Delhi 011-24682100	Sakshi Dasgupta	Setting up water kiosk with UV technology in urban slum of Delhi

Details of private bodies for-profit organizations (Commercial Business Houses)

Sl. No.	Name of the company	Address	Products
01.	Eureka Forbes	Konkan Nagar Co-operative Housing Society Ltd. ,Mumbai - 400 016.	AquaGuard
02.	Kent Mineral RO	Pure Water House, # 30 , 6th Cross, Hutchins Road, St. Thomas Town, Bangalore-560084.	RO, UV and membrane purifiers
03.	Pall Pharmalab Filtration Ltd	Star metal compound, l. b. s. road, vikroli (w), MUMBAI 400083	Filters

Annexure 6 Details of Manufacturers / Assemblers of Reverse Osmosis / Ultra Violet Plants

Sl. No.	Name	Address	Contact Person	Telephone/ e-mail/web
01	Aqua Fillsep Water Treatment Pvt Ltd	A1/1, Chinubhai Tower, Opp Handloom House, Ashram Road, **Ahmedabad**-380009	Ashwin Doshi, Riteshbhai	079-6580047 M.9825048142 ashwin@ aquafilsep.com
02	Aqua Treat	11, Sukhshine Complex, Sunrise Park, Off. Drive-in Road, Thaltej, **Ahmedabad**	Rajiv Sharma	079-26851491 Fax-26855491 M.9825033604
03	Doshion Ltd.	Plot No.24, PhaseII GIDC Vatva, **Ahmedabad**-382445	K.D.Panchal	079-25831156 25891916 Fax-25833302 M.9374240407 e-mail: cwsd_hq@doshion.com web:www.doshion.com
04	Panda Water	38/1 Panchratna, Industrial	Maharshi Patel	02717

	Tech Pvt Ltd	Estate, Sarkhej Bavia Highway Road, Changodar, **Ahmedabad**		251880/251882 Fax: 079-26766403 M.9374240407
05.	Power H2O	704, Abhijeet, Mithakhali six roads, Ellisbridge, **Ahmedabad**-07	Monal Chokshi	079-26402392/93 Fax 079-26409196 e-mail: utilityappliances@utilityappliances.net
06	Shivam Water Treaters Pvt Ltd	Shivam House, 3, Kahan Krupa, Vasna Bus Stop, Dr. Jivraj Mehta Hospital Rd. Vasna, **Ahmedabad**-07	Chirag Patel	079-26632595 079-26632795 Fax: 26614385 M. 9879204148
07.	Hi-tech Sweet Water Technologies Pvt Ltd	229/230, Turning Point, Ghod Dod Road, **Surat**	Jayesh Patel	M.9898047831, 9898047820 Fax 0261-2234907 e-mail: info@hi-techwater.com www.hi.techwater.com
08.	ION Exchange	Nirali Apartment, Nr. Telegraph Office, Ellora Park, Baroda-390023 Tiecicon House, Dr E Moses Road, Mahalaxmi, **Mumbai**:400011	Manish Bhatt (Baroda) Ajay Popat (Mumbai)	M. 0932400240 0265-2396506/6507/7638 Fax: 0265-2398508 Fax: 022-27636156
09.	K.B. Aquapure(P) Ltd	Amrita Aqua Equipment Pvt Ltd,. B-5, Magnum House-II, Karampura, **New Delhi**-110005		55445756 M. 9810124336 e-mail: rekhurmi_2k@yahoo.com
10.	Man Kastu Implex (P) Ltd	WZ-0-27, Street 22, New Mahabir Nagar, Outer Ring Road, Opp. Vikas Kunj, **New Delhi**-18		Email: mankastu@vsnl.net
11.	Flew Star Instrument (P) Ltd	7F/2, Northern Industrial Complex, 20/3, Mathura Road, **Faridabad**		0129- 5060669 Fax: 5065661
12.	Genesis Membrane Sepratech Pvt.Ltd.	18, Vardhaman Complex, Near MTNL Office, 10, LBS Marg, Vikhroli (W), **Mumbai**-400083	B Chakravarty Viren Gohil	M 9322229520 M 9821007602 P.0091-22-2577 5456 P.0091-22-2577-5458 Fax: 25790608
13.	Konark Fixtures Ltd	335, Adhyaru Industrial Estate, Lowerparel,		56602711, 7655 24922259

		Mumbai-13		Email: konark@bom3.vsnl.net.in
14.	Thermax Ltd	Thermax House, bhonsari, MIDC, **Pune**	Marketing Manager	
15.	Primus Enviro System	6/4, Indravil, Navarathna Gardens, 1st Main Road, Ek Kattuthangal, **Chennai**-600079		044-52647271/7272 Fax:22325949 M:9443322843 Email: primus@eth.net

Source: Adopted from Madhukar (2007), reports, IFMR Trust

Abbreviations

ACF	:	Activated Carbon Filter
AMC	:	Annual Maintenance Contract
FPRM	:	Fellow Program in Rural Management
GOI	:	Government of India
IRMA	:	Institute of Rural Management, Anand
MOU	:	Memorandum of Understanding
NGO	:	Non Government Organization
NPO	:	Non Profit Organization
PHED	:	Public Health and Education Department
RO	:	Reverse Osmosis
RS.	:	Rupees
TDS	:	Total Dissolved Solids
UV	:	Ultra Violet
WHO	:	World Health Organization